Space Weather Technical Forecast

Issued on Friday 7 March 2025 at 01:06 Local

This technical forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: Chance of M-class flares (R1-R2; Minor-Moderate radio blackouts) throughout. G1/G2 likely Days 2/3.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low with occasional low level C-class activity in the past 24 hours.

There are currently seven sunspot regions on the visible solar disc, as two regions AR4015 and AR4010 have now faded. AR4012 in the southeast quadrant remains the largest region and is slowly increasing. It has been re-classified as an Eki due to growth of penumbra. AR4016 in the southeast is slowly increasing, but its magnetic complexity has reduced from beta-gamma-delta to a beta-gamma. AR4009 was re-classified as Cao due to development of leader spot. AR4007 nearing the southwest limb, is a relatively simple bi-polar group. Remaining spots small, weak and stable.

No Earth-directed Coronal Mass Ejections (CMEs) were identified in available coronagraph imagery.

Solar Wind / Geomagnetic Activity: Solar winds, as measured by ACE at L1, were gradually decreasing between 380-450km/s. Solar winds speeds started Slightly Elevated and are now at Background. Solar wind density was below Average. The Interplanetary Magnetic Field was mainly Weak, and the north-south component was Weak and variable, between +7/-7nT. The phi angle was largely positive (away from the Sun), with brief incursions to neutral or negative (towards the Sun). Geomagnetic activity was Quiet (Kp 1-2), as observed by BGS.

Energetic Particles / Solar Radiation: High energy proton flux (greater than 10MeV) at GOES18 was at Background.

High energy electron flux saw a rise in its diurnal oscillation, reaching Moderate levels of 334pfu at 06/1740UTC. The 24-hour fluence was below the Active threshold (1e8 integrated pfu), on a declining trend, recording 7.79e6 integrated pfu at 06/2359UTC.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be generally Low, with a chance of isolated M-class flares.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

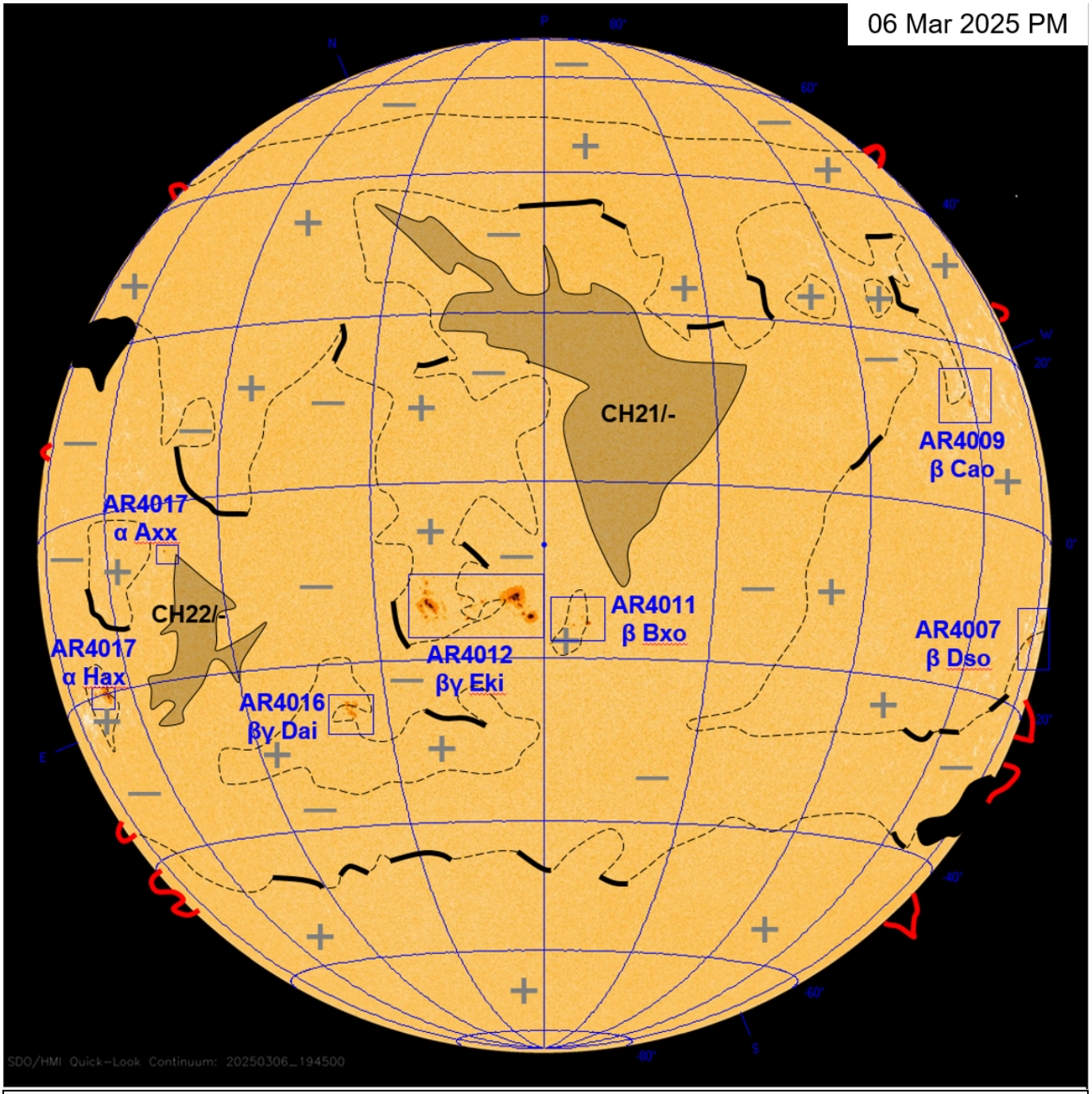
Solar Wind / Geomagnetic Activity: There are currently no Earth-directed CMEs in the forecast. Background solar winds are expected at first. During day 2 (8 March) Earth is likely to connect with the High Speed Stream from CH21/-. Solar wind speeds are expected to increase to Elevated to Strong. Geomagnetic activity is expected to be Quiet to Unsettled (Kp 1-3) on day 1 (7 March). However, on day 2 (8 March) and during day 3 (9 March) periods of Active to G1/minor geomagnetic storm (Kp 4-5) are likely with a chance of isolated G2/Moderate geomagnetic storms (Kp 6). On day 4 (10 March), periods of Unsettled to Active are likely with a chance of G1/minor geomagnetic storm (Kp 4-5).

Energetic Particles / Solar Radiation: High energy proton flux should remain at Background levels. High energy electron flux is likely to remain background to Moderate at first. There is a chance of further enhancements from fast wind with High likely by day 4. The associated 24 hour fluence is expected to remain below the Active threshold.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Figure 1: Synoptic Solar Map



Key: Filament ___ , Prominence ___ , Magnetic Field Line - - - , Polarity +/-, Coronal Holes: Grey shaded area CHxx +/-, Sunspot groups 25xx - Mt Wilson α-β-βγ-βγδ and Zurich-McIntosh Axx etc.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Geomagnetic Storms

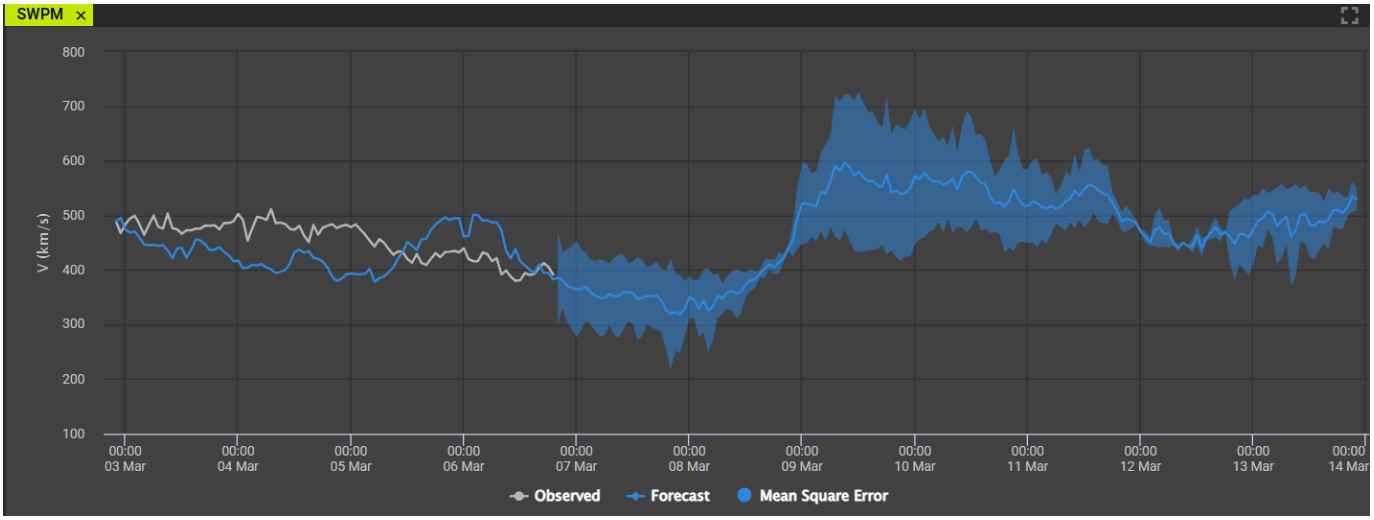
There are currently no Earth-directed CMEs in the forecast.

Slightly Elevated winds have declined towards Background. Later on day 2 (8 March) Earth is expected to connect with the High Speed Stream from CH21/-. Elevated to Strong wind speeds are expected, this is supported by 27 day persistence and MOSWOC Enlil.

Geomagnetic activity is expected to be Quiet to Unsettled (Kp 1-3) on day 1 (7 March). However, on day 2 (8 March), geomagnetic activity is expected to increase due to connection with CH21/-. Given that we are approaching the vernal equinox and G1/minor storm level was observed on the previous rotation, periods of Active to G1/minor geomagnetic storm (Kp 4-5) are likely, with a chance of isolated G2/Moderate geomagnetic storm (Kp 6) later on day 2 (8 March) or during day 3 (9 March). On day 4 (10 March), periods of Unsettled to Active are likely with a chance of G1/minor geomagnetic storm (Kp 4-5).

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	60	70	50
Strong	G3	No	1	10	10	5
Severe	G4	No	1	1	1	0
Extreme	G5	No	1	1	1	0

Figure 2: MOSWOC 27 day persistence



Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Radio Blackouts - X-Ray Flares

There are currently seven sunspot regions on the visible solar disc, as two regions AR4015 and AR4010 have now faded. AR4012 in the southeast quadrant remains the largest region and is slowly increasing. It has been re-classified as an Eki due to growth of penumbra. AR4016 in the southeast is slowly increasing, but its magnetic complexity has reduced from beta-gamma-delta to a beta-gamma. AR4009 was re-classified as Cao due to development of leader spot. AR4007 nearing the southwest limb, is a relatively simple bi-polar group. Remaining spots are small, weak and stable.

Solar activity is expected to be generally Low, with a chance of isolated M-class flares. The main risk from AR4012 and AR4016 in the southeast.

X-Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 (M Class)	No	40	40	40	40
Very Active	R3-R5 (X Class)	No	5	5	5	5

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Solar Radiation Storms (High Energy Protons)

GOES18 high energy (>10MeV) proton flux is at Background, and expected to remain at this level. There is a Slight Chance of enhancement to S1 given any significant eruption from the sunspot regions currently on the Earth-facing disc.

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	5	5	5	5
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

High Energy Electrons (≥ 2MeV)

The high-energy electron flux (>2MeV), as observed at GOES16, has been Normal Background to Moderate which is expected to continue at first. There is a chance of further enhancements from fast wind with High likely by day 4.

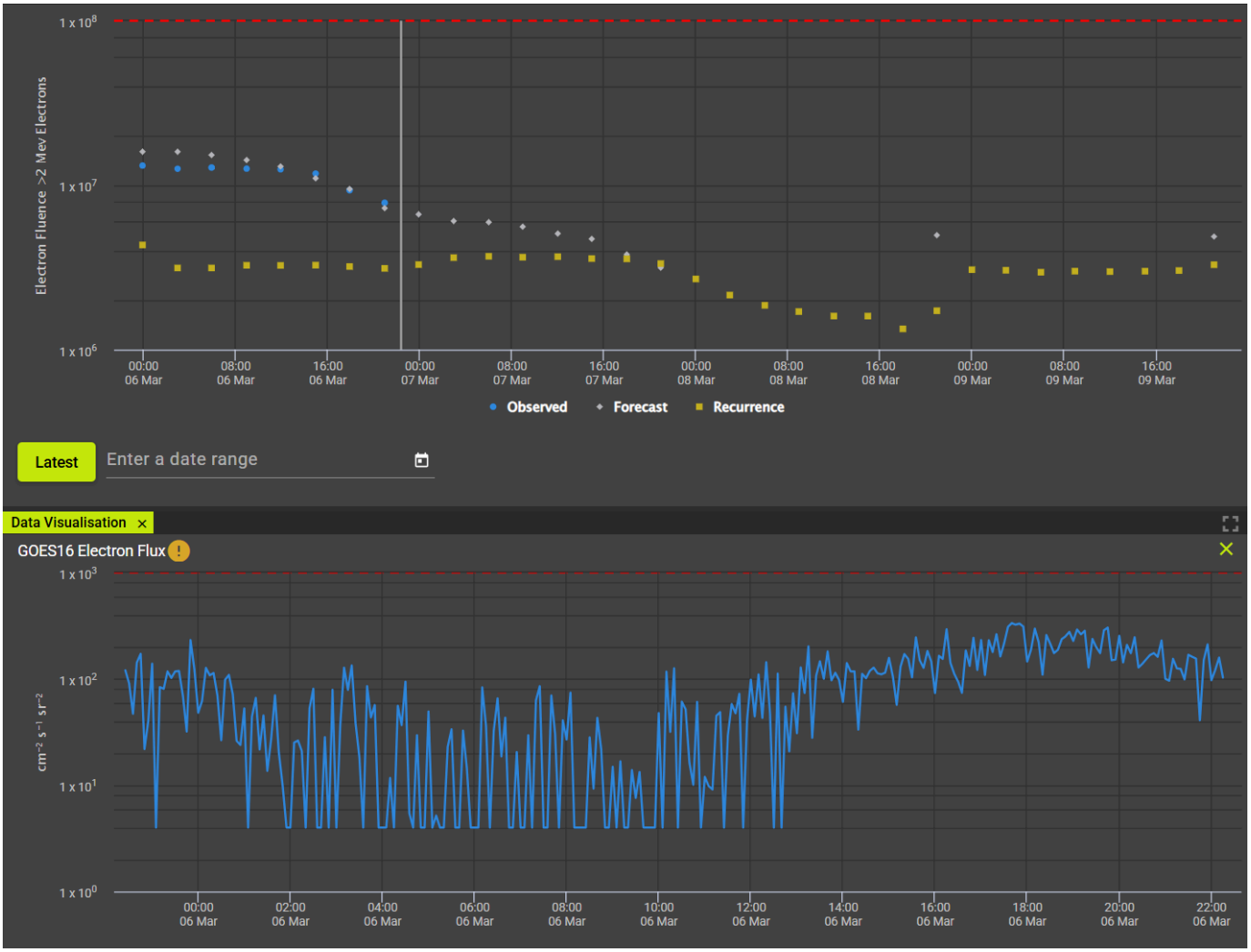
The associated 24-hour fluence is declining and is likely to remain below Active as indicated by MOSWOC REFM guidance output.

GEO Electron Environment	Level ($cm^{-2}sr^{-1}$ day^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ 2 MeV ≥ 1×10^{8}	No	1	1	1	1
Very Active	≥ 2 MeV ≥ 1×10^{9}	No	1	1	1	1

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Figure 3: MOSWOC REFM and GOES16 Electron Flux



© Crown Copyright 2025. All Rights Reserved.